Spring Flood Outlook

National Weather Service
WFO Twin Cities / Chanhassen

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February 21, 2019

Typical Spring Flood Factors

- **Past Precipitation / Soil Moisture**
  What was our soil/streamflow status going into freeze-up?

- **Snowpack**
  What will we have to fuel the streamflow this spring?

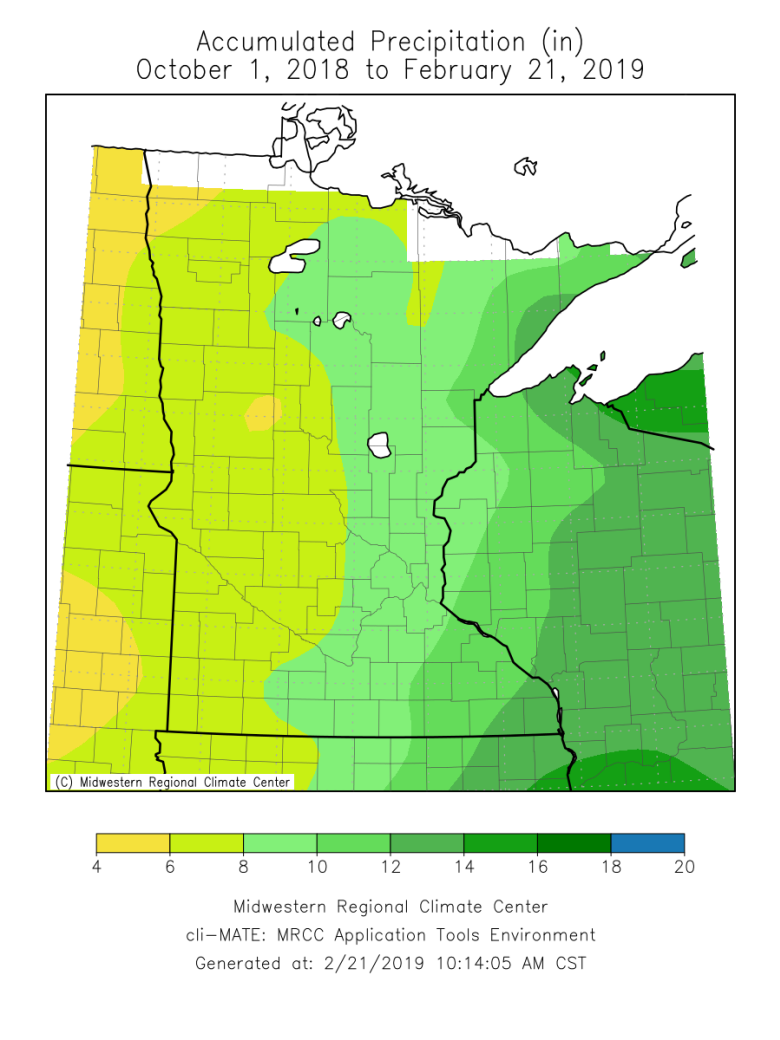
- **Frost Depth**
  Will runoff flow freely?

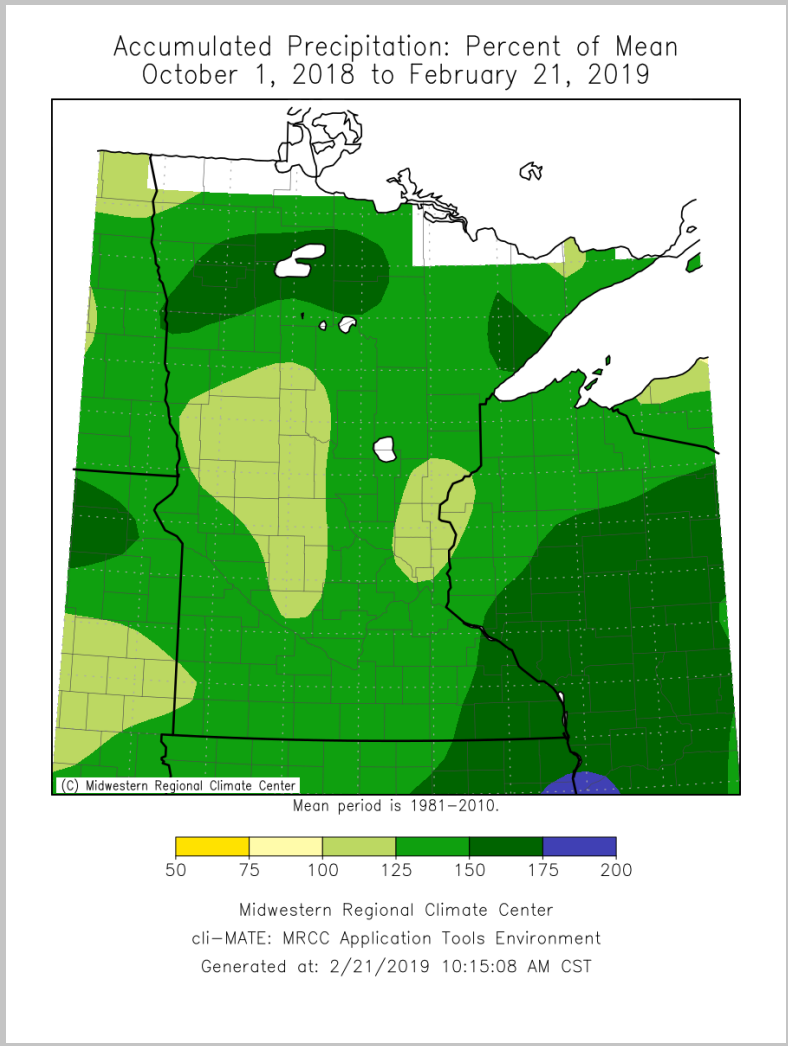
- **Weather Outlook -- for potential snow or rain**
  Biggest wild card every year…what will we get in the spring?

  Let's evaluate them…

Water Year Precipitation and Percent of Normal

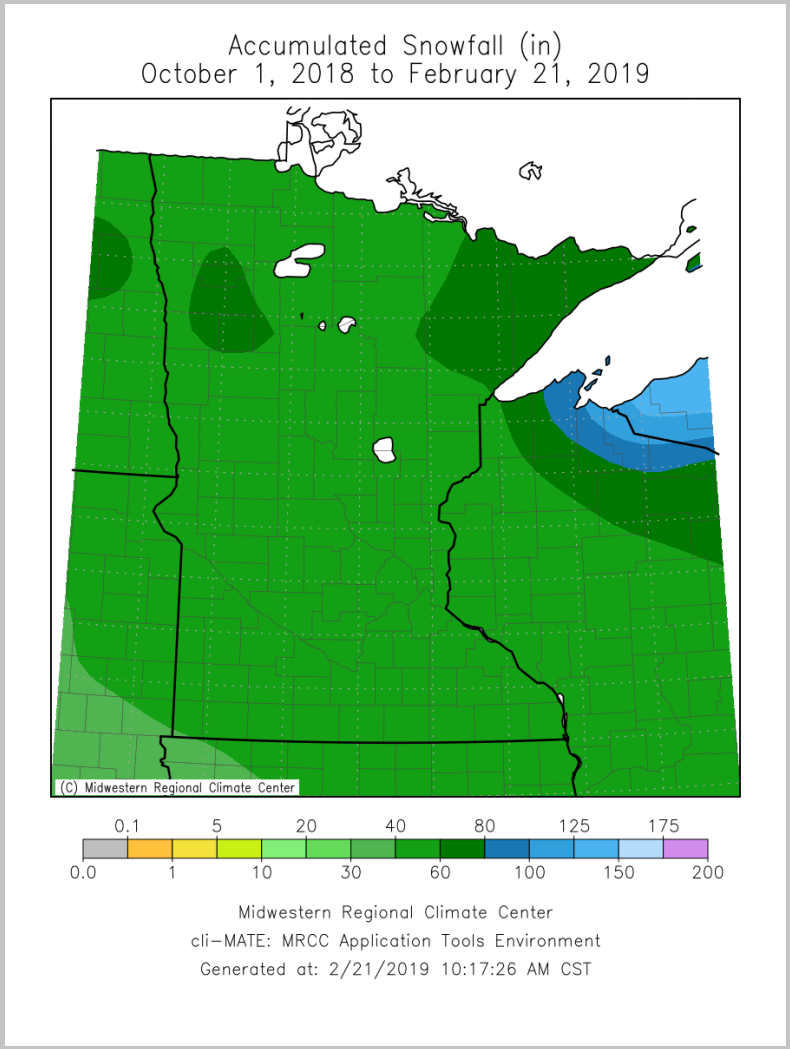
Amount of precipitation since Oct 1, 2018

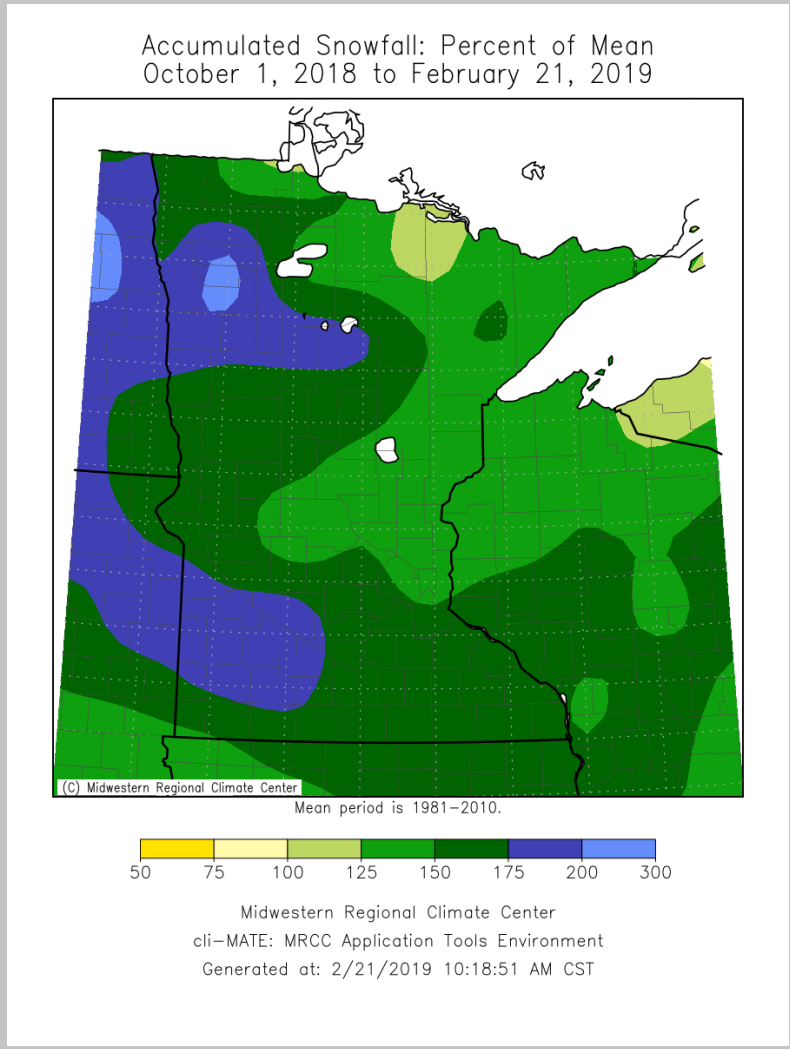




Six to eight inches west, rising to 10-12 inches in western WI. All above normal, with the highest amounts north and south, as well as into WI.

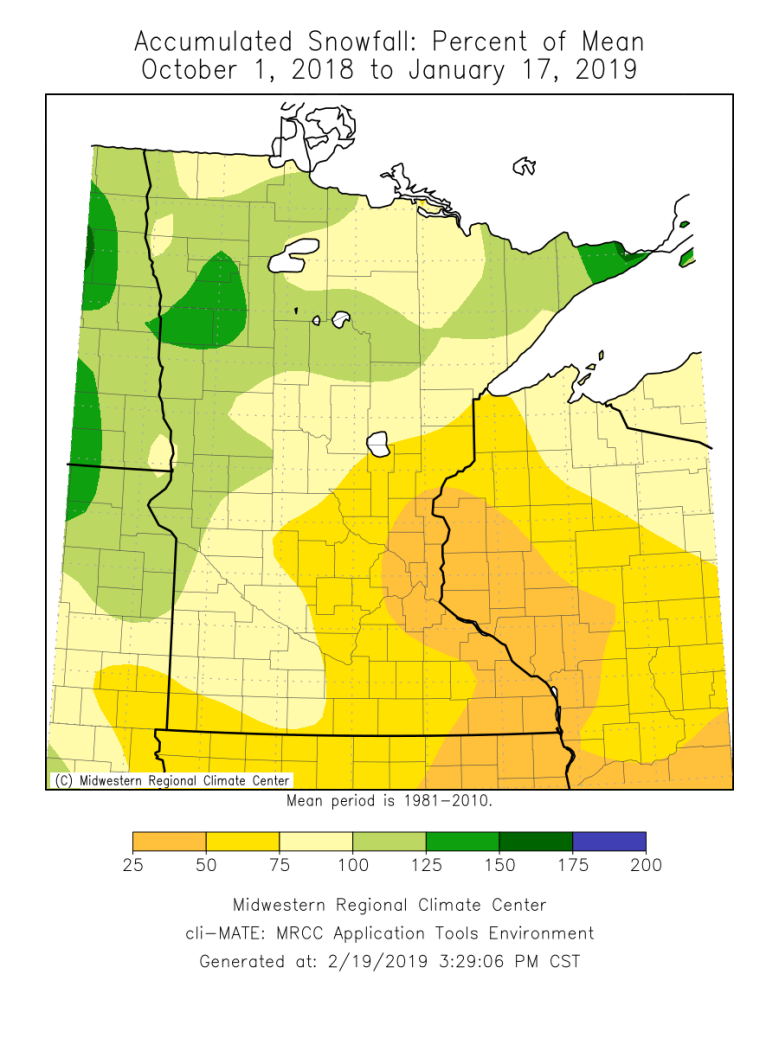
Winter Season Snowfall and Departure from Normal

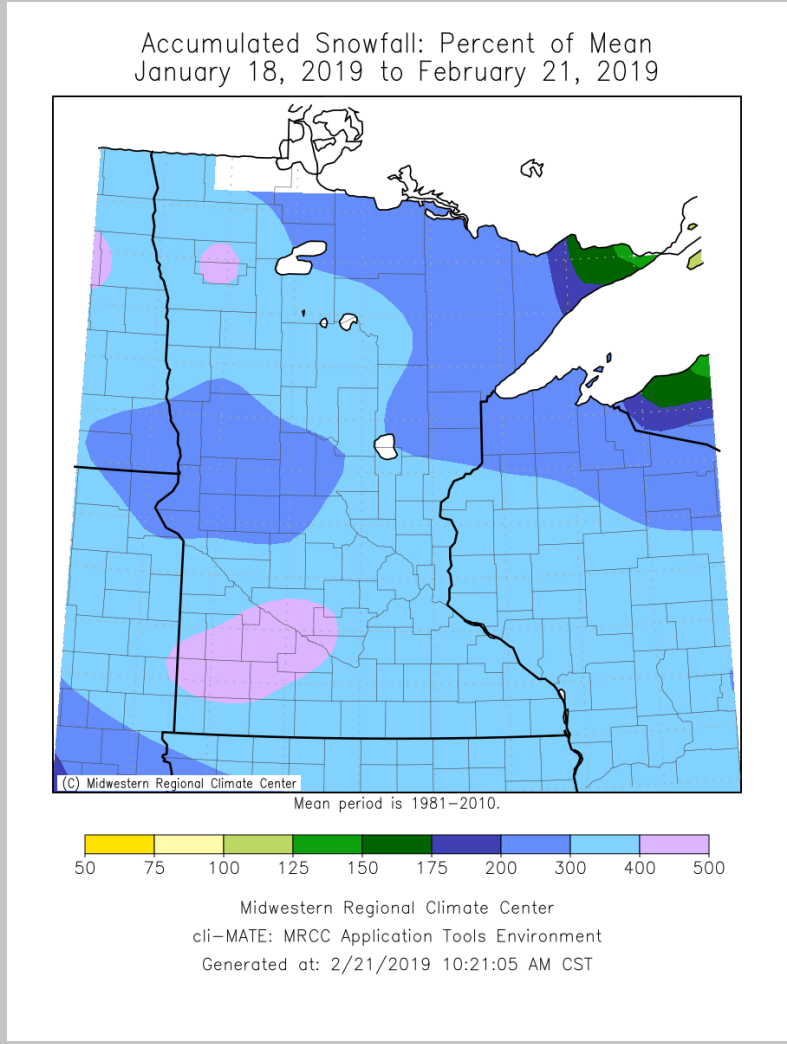




40 to 60 inches of snow has fallen this winter over the entire region. That is a solidly above normal…and approaching double the normal in southwest MN.

Tale of Two Winters --- Before and After Jan 17th

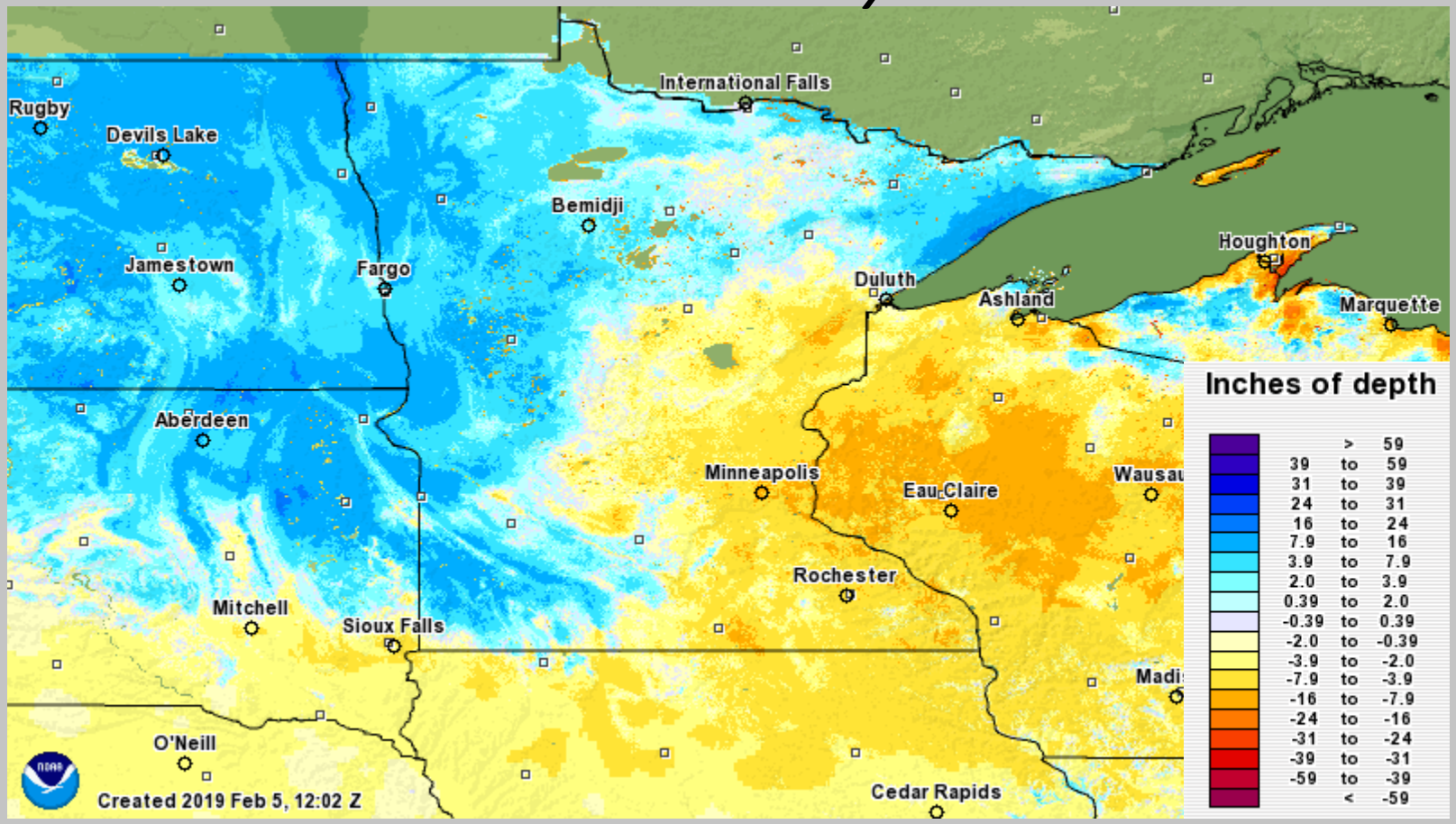




Much of the area had less than 50 percent of normal snow on January 17th . Since then, 200 to 400 percent of normal snow has fallen (30-45 inches in some areas).

Snow Depth Departure from Normal

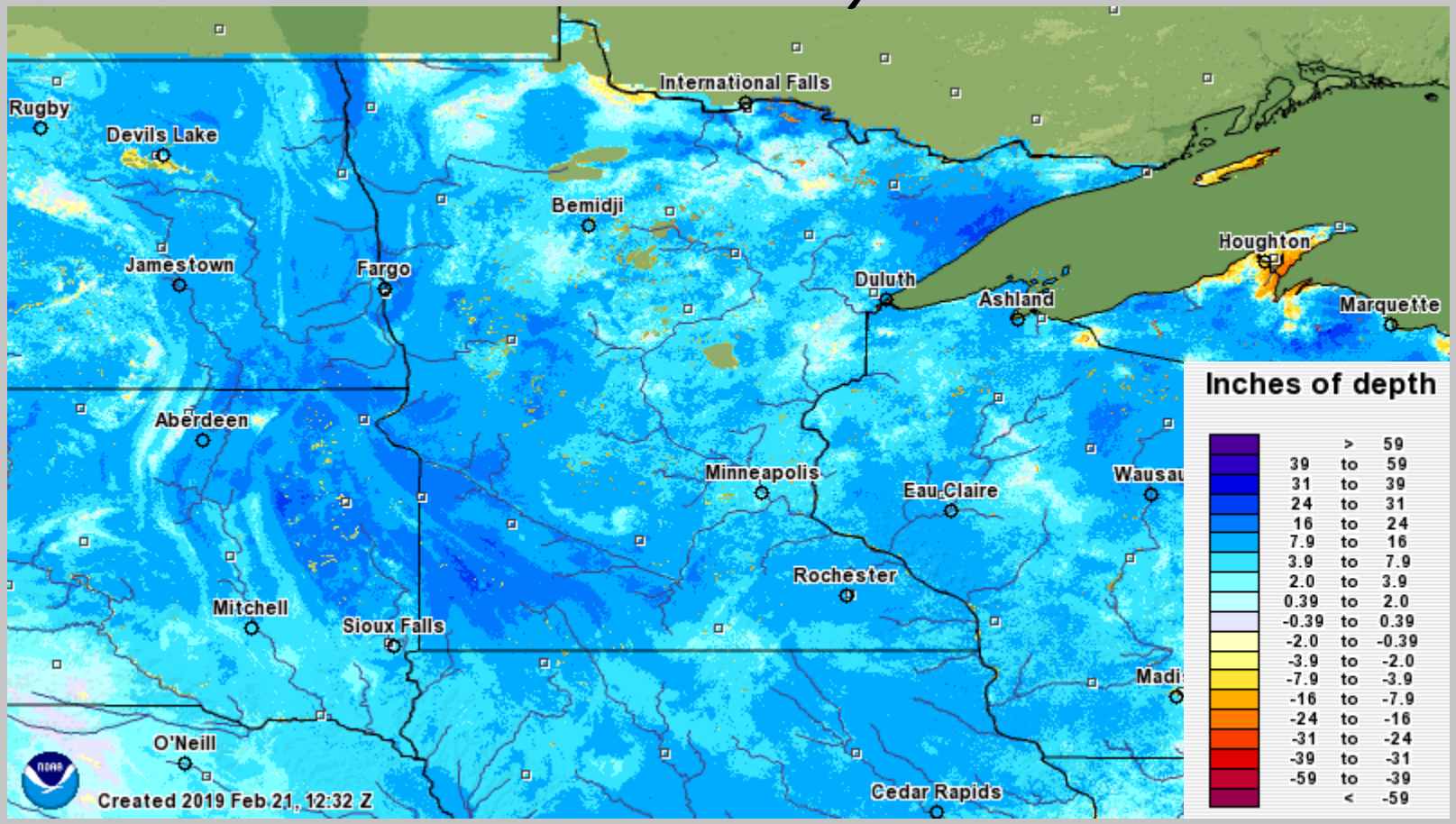
…on February 5th



Most of the area was below normal earlier this month…central MN into WI were close to a foot below normal.

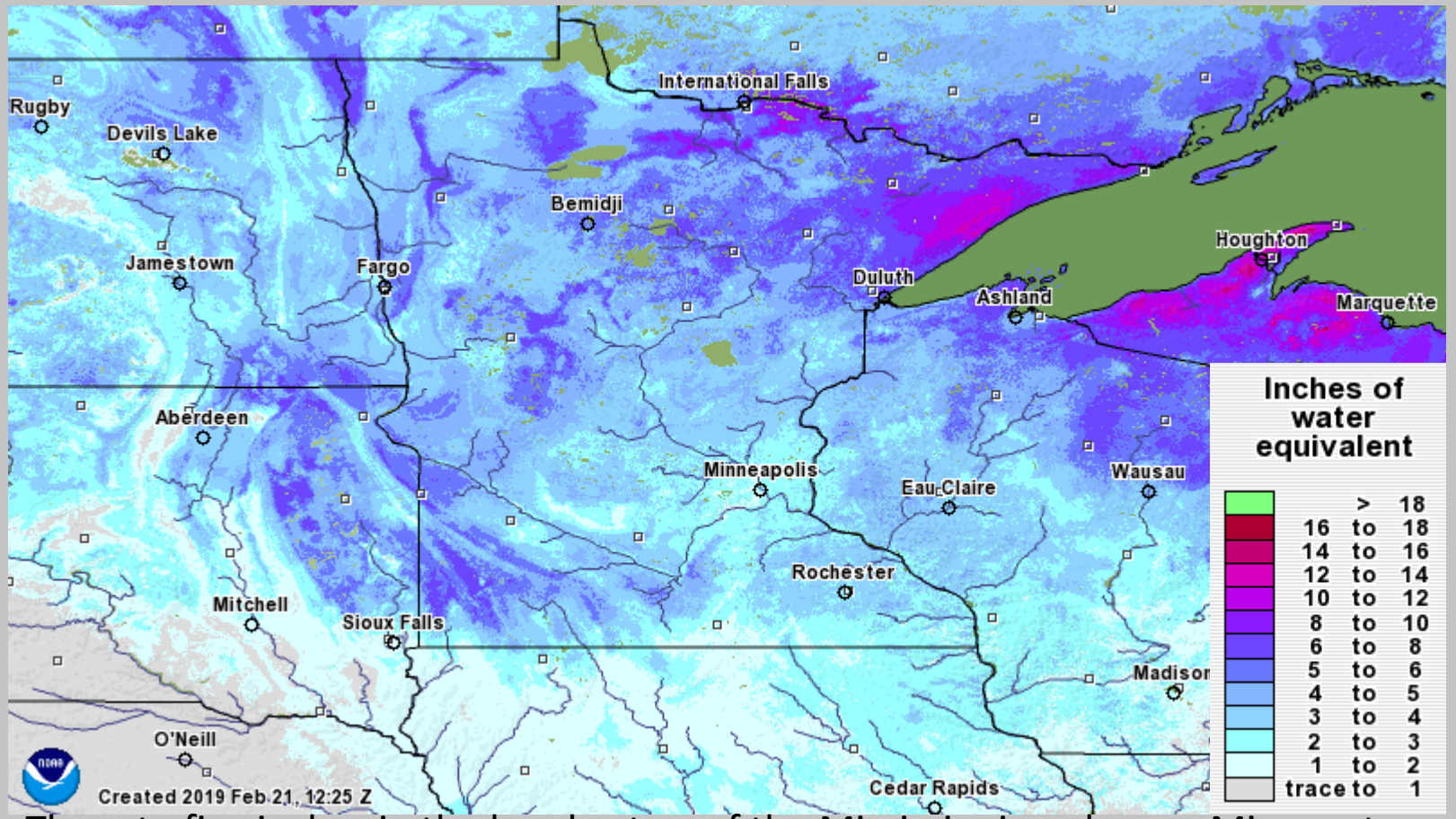
Snow Depth Departure from Normal

…on February 21st



By this week, all areas are above normal. SW MN nearly 2 feet above normal, with large areas seeing a foot above normal in MN and western WI.

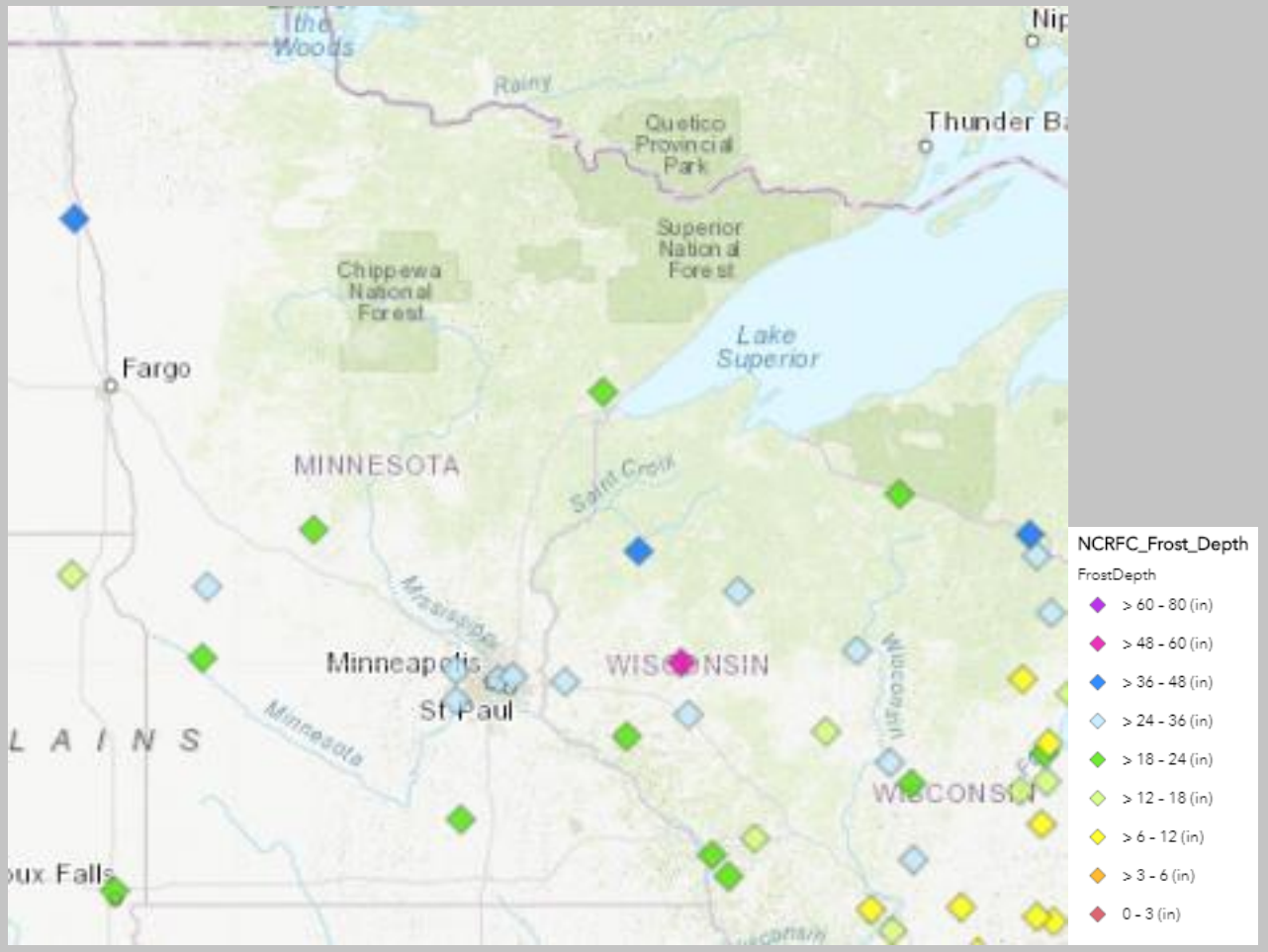
Snow Water Equivalent (modeled)



Three to five inches in the headwaters of the Mississippi, and some Minnesota tribs in southwest MN; also 3 to 5 in the St. Croix and Chippewa (WI).

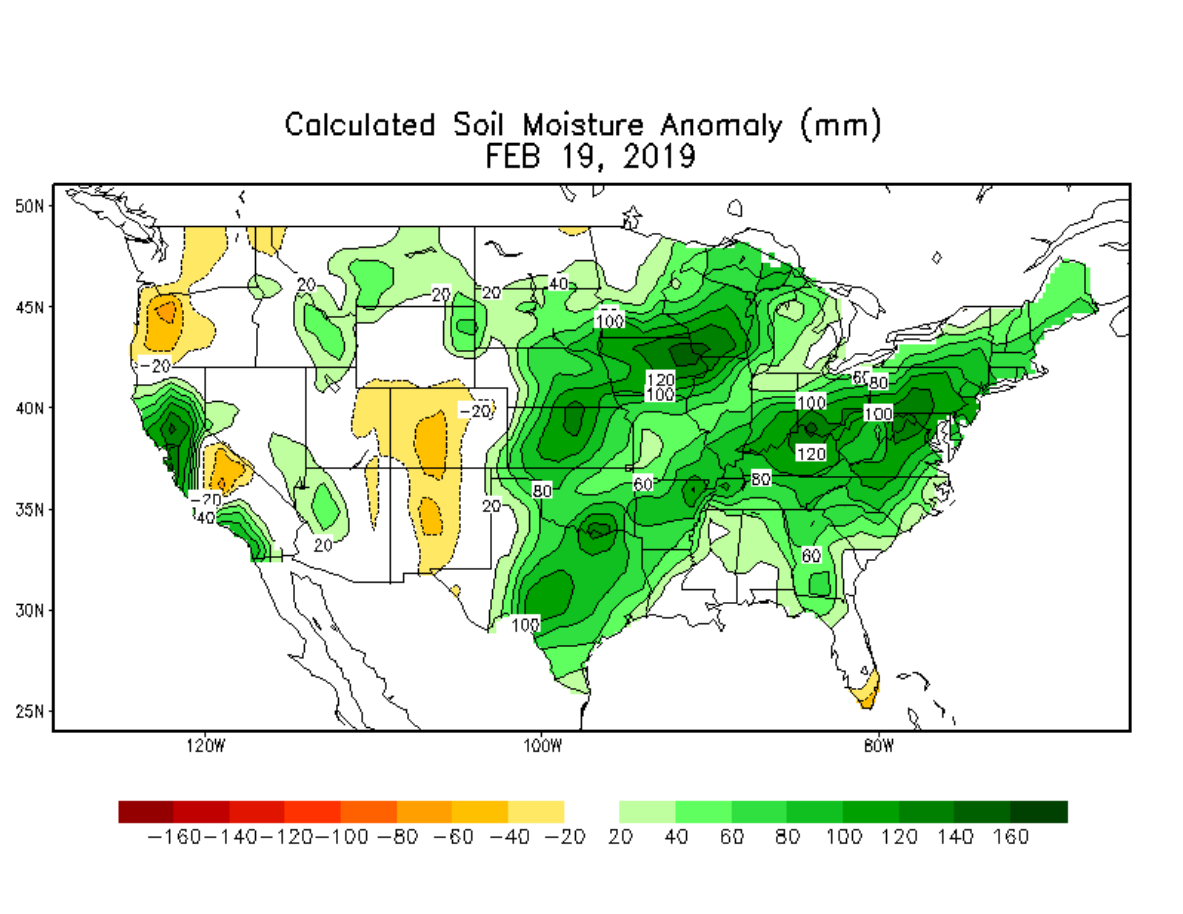
This is higher than we've seen recently, and in some areas is well above "normal" for late February.

Frost Depth



Mostly 2 to 3 feet, some to 4 feet; solid depth.

Soil Moisture Anomaly



Soils were fairly wet when they froze up this winter, especially south.

Spring Flood Elements

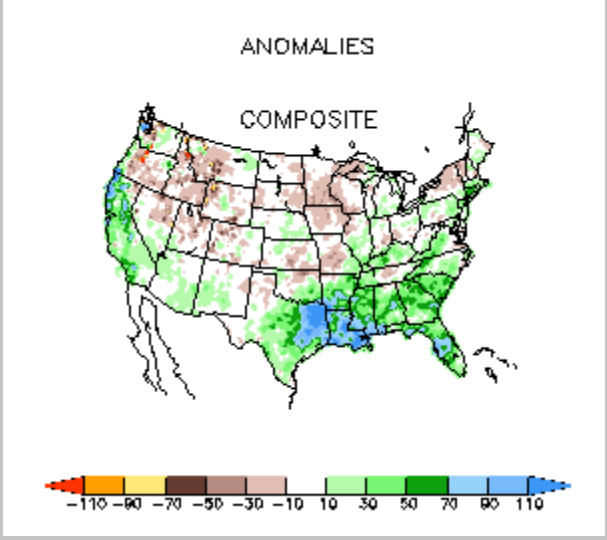
- **Snowpack/Snow Water**
  - Above normal, in some places significantly above normal.
- **Frost Depth**
  - 2 to 3 foot frost depth statewide…fairly deep frost
- **Soil Moisture**
  - Mostly above normal before freeze up
- **Drought**
  - None of note (not shown)

For spring 2019…the snowmelt flood threat is higher than it has been for a few years. Near to above normal precipitation, and/or a period of very warm temperatures in March would increase that threat.

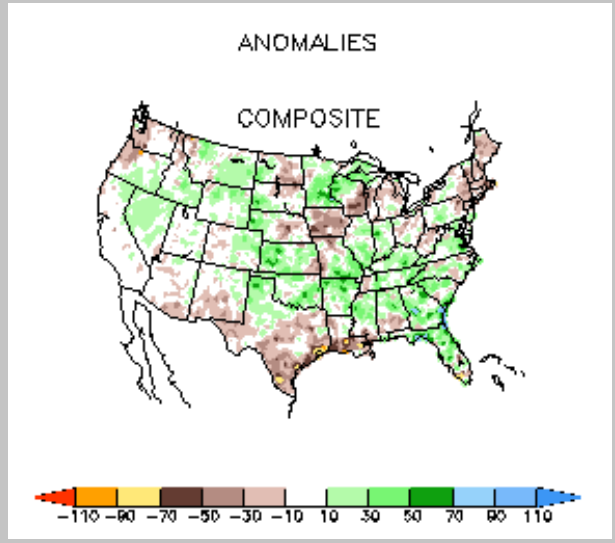
Let's look at forecast trends for the spring
Overall Pattern

We have a weak El Niño in progress. In El Niño years…

…the trend since 1985 has been for below normal spring (Mar-Apr-May) precipitation over the area



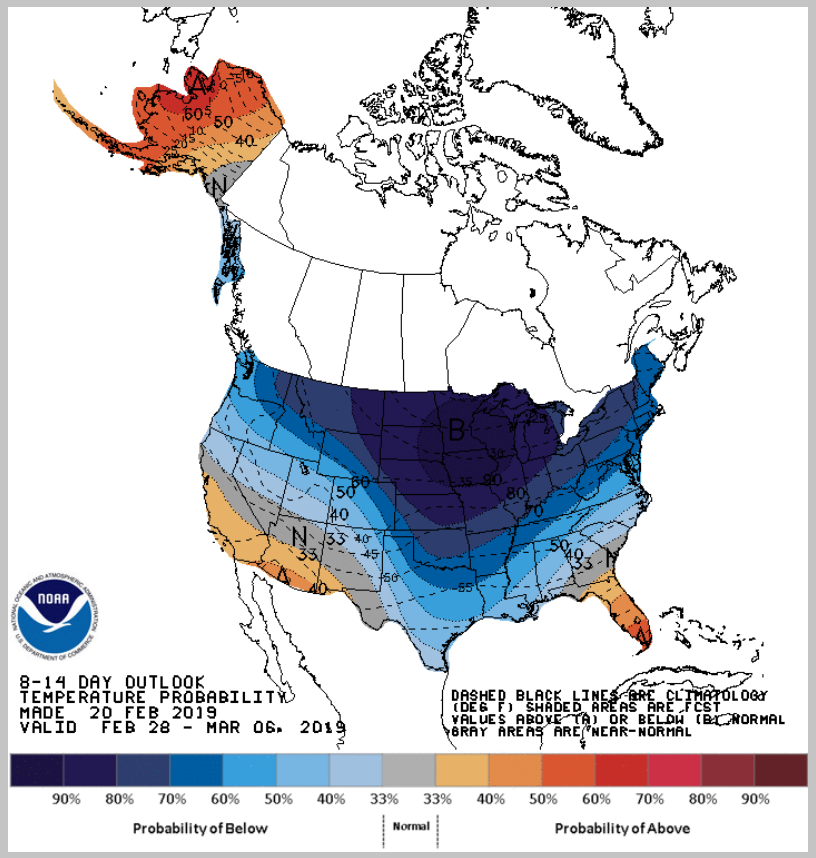
Followed by above normal summer rain (Jun-Jul-Aug)



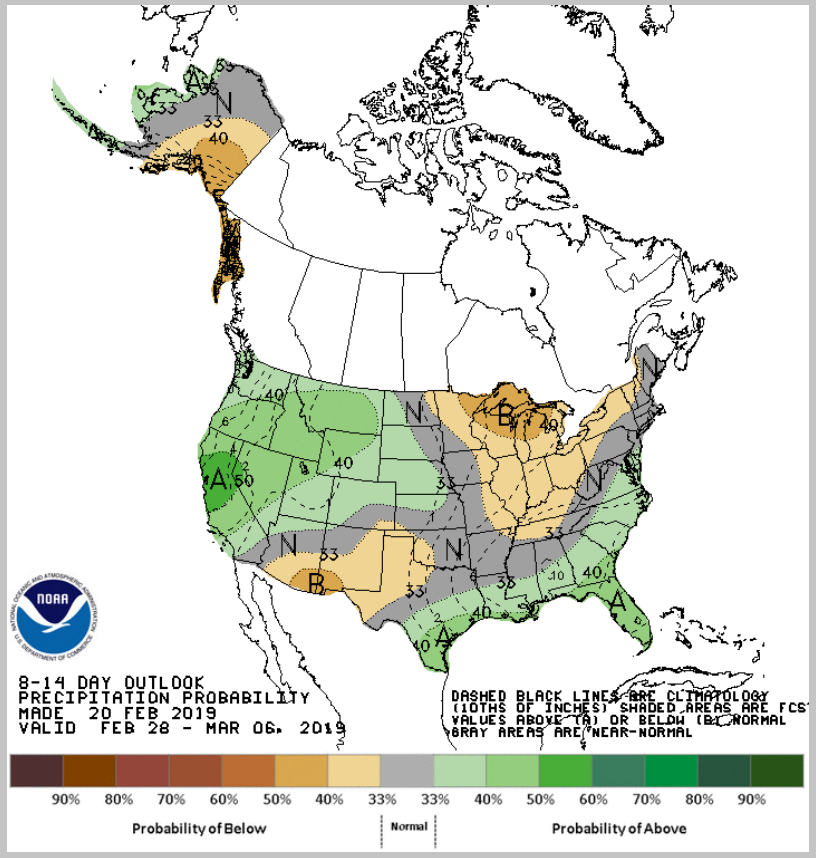
Let's look at forecast trends for the spring

Next Two Weeks

Cold continues…

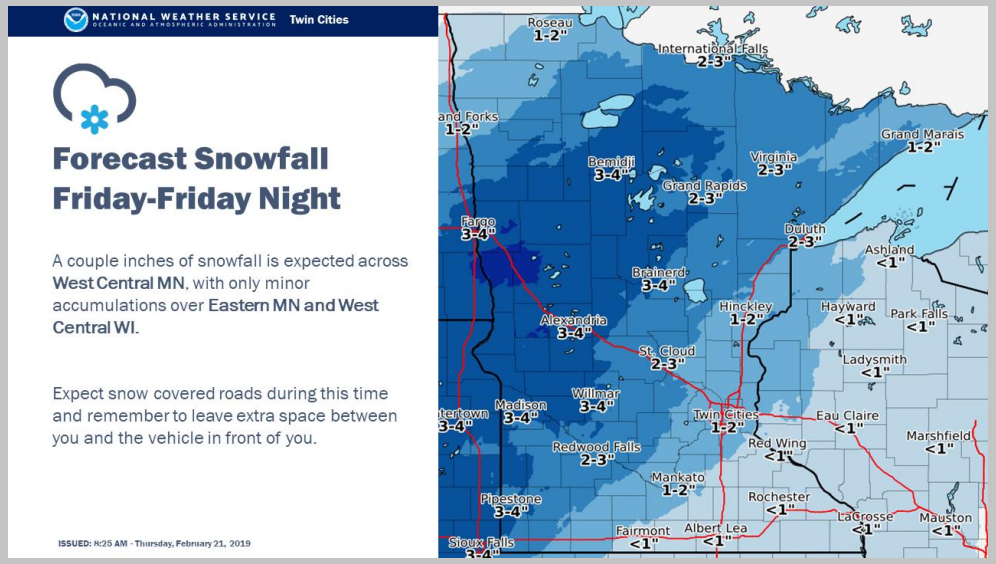


Two more snow events before becoming drier in week two

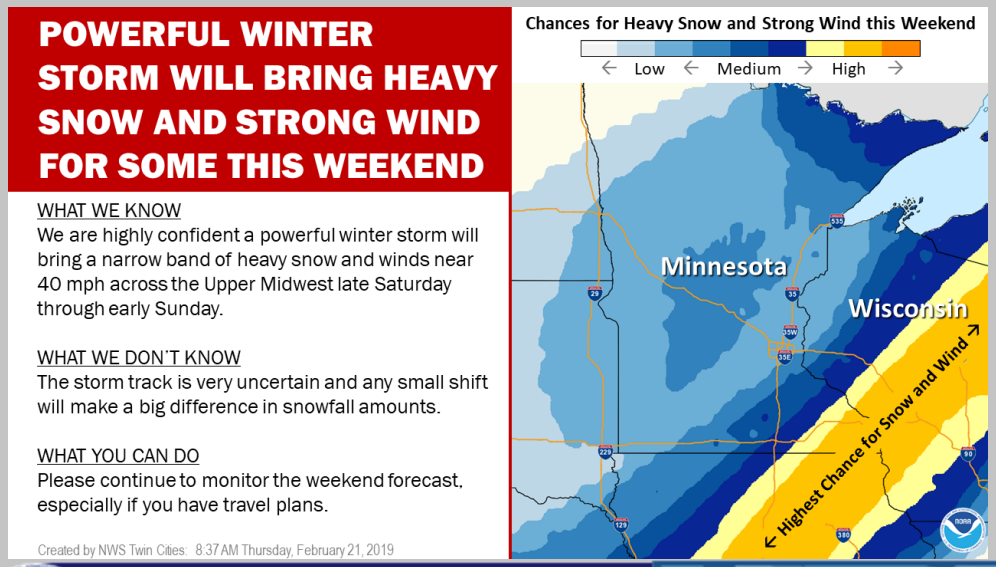


Let's look at forecast trends for the spring

…about those two storms…



First storm brings a few inches of snow, mostly to the west on Friday…

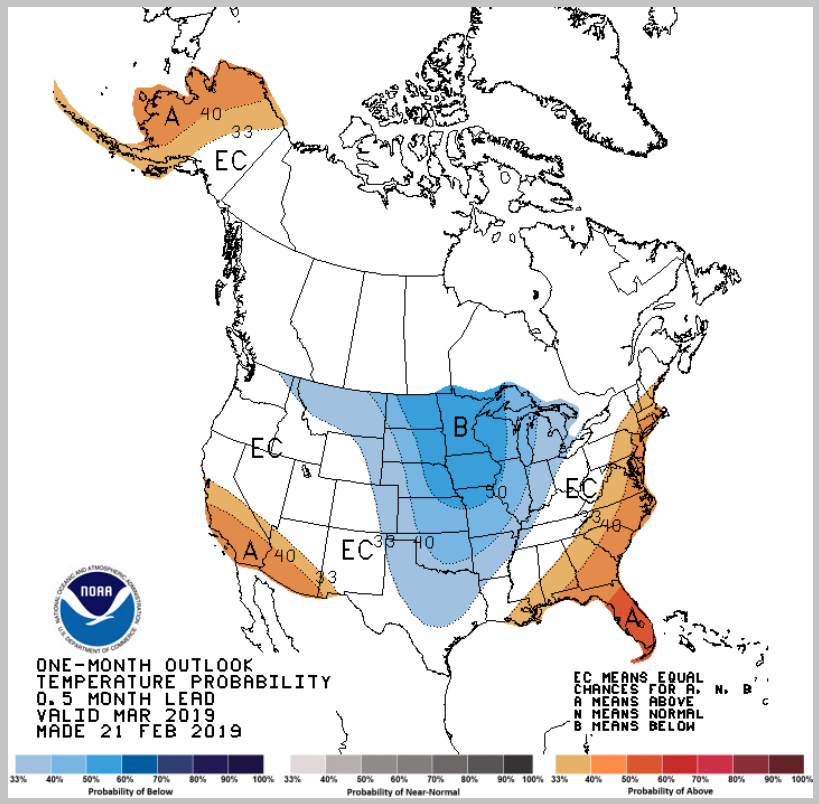


The second and larger storm is targeting our southeast area…remain wary of the track. This will be a major storm for someone.

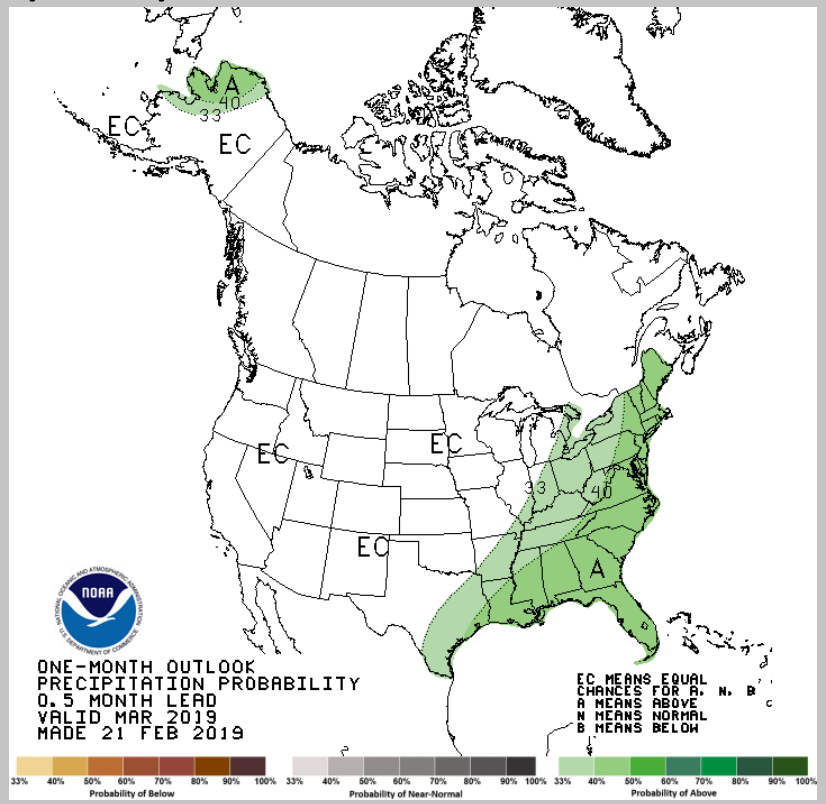
Let's look at forecast trends for the spring

Outlook for March

Cold trough remains over the us, especially early in the month…

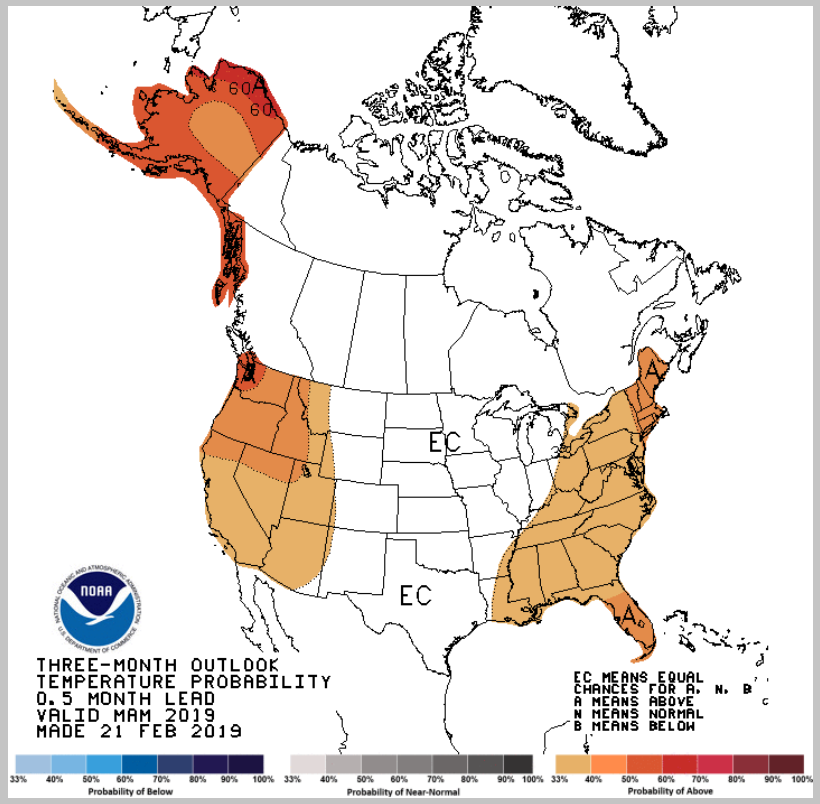


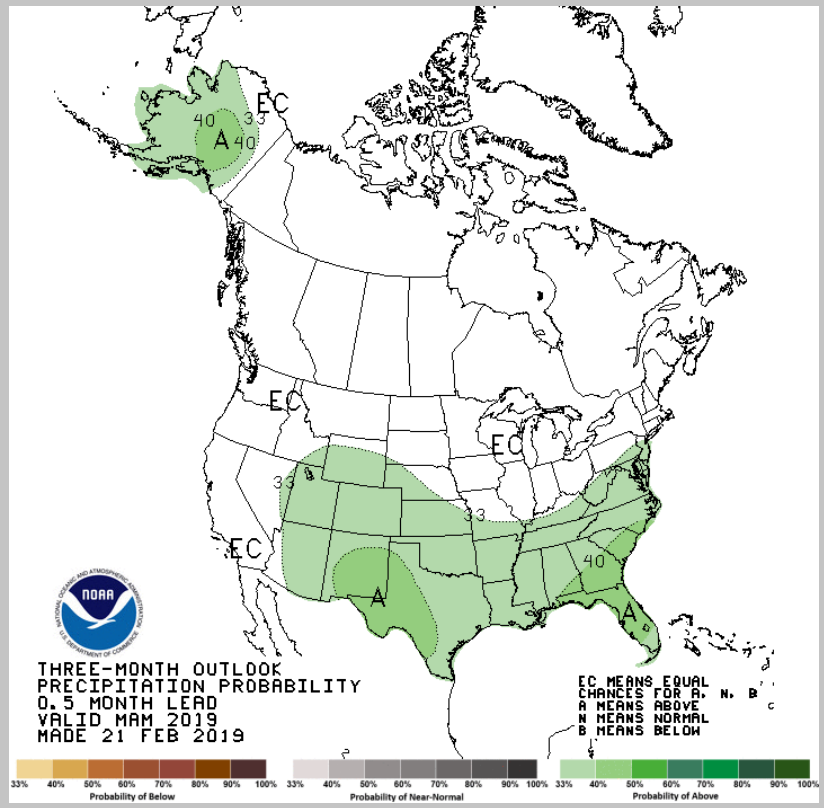
…this helps push the best chances for above normal precip to the southeast.



Let's look at forecast trends for the spring
March-April-May 90 Day Outlook

CPC finds no strong signal over the upper Midwest for either temperature or precipitation.





Revisiting the Earlier Statement:

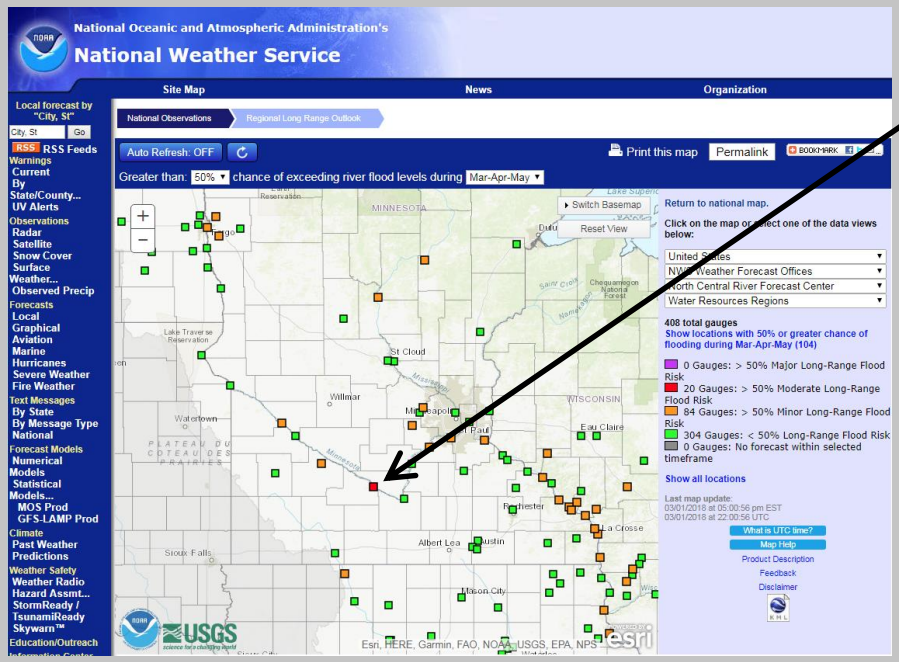
"For spring 2019…the snowmelt flood threat is higher than it has been for a few years. Near to above normal precipitation, and/or a period of very warm temperatures in March would increase that threat."

Early indications are for cooler and drier than normal conditions in early March. Long range models indicate some moderating temperatures and precipitation later in the month, so keep looking for updated forecasts as we move ahead.

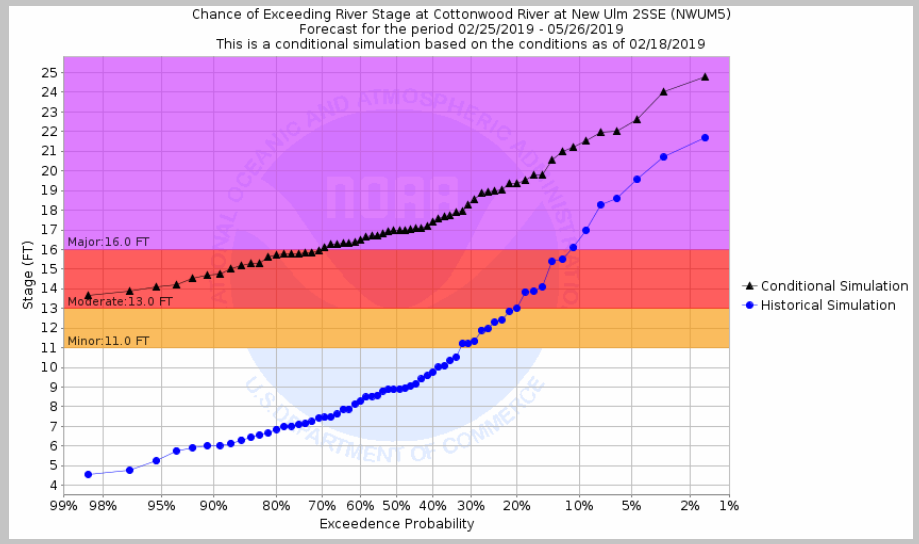
Chance of Exceeding Flood Levels

Long range flood risk available at: https://water.weather.gov/ahps2/long_range.php?wfo=MPX

River forecasters run long range river models, including current soil moisture profiles, snow pack info, and 45-day model precipitation forecasts. The result is a graph of probability of reaching various stages .



Click a point in here -- check the "Probability Information" tab – and select this probability graph



Black Line represents the newest forecast – **Blue Line** represents historical average
When the **black** line is to the left/above of the **blue** line, the flood threat is above normal.

Spring Flood Potential

Probability of Reaching Moderate/Major Flood Stage

Minnesota River Basin (highlights)

- Minnesota River at Montevideo

Moderate FS 16.0 ft 94% vs Typically 26%

Major FS 17.0 ft 66% vs Typically 15%

- Redwood River at Redwood Falls

Moderate FS 15.0 ft 4% vs Typically <1%

(Minor FS (6.0) is very likely, however)

- Cottonwood River at New Ulm

Moderate FS 13.0 ft 99% vs Typically 20%

Major FS 16.0 ft 70% vs Typically 11%

Spring Flood Potential

Probability of Reaching Moderate/Major Flood Stage

Minnesota River Basin (highlights)

- Minnesota River at Henderson

Moderate FS 736.0 ft 49% vs Typically 8%

Major FS 739.5.0 ft 13% vs Typically 4%

- Minnesota River at Jordan

Moderate FS 28.0 ft 87% vs Typically 15%

Major FS 34.0 ft 16% vs Typically 2%

- Minnesota River at Savage

Moderate FS 710.0 ft 81% vs Typically 14%

Major FS 712.0 ft 57% vs Typically 10%

Spring Flood Potential

Probability of Reaching Moderate/Major Flood Stage

Mississippi Basin (highlights)

- SF Crow River at Delano

Moderate FS 12.0 ft 41% vs Typically 14%

Major FS 14.0 ft 25% vs Typically 11%

(similar for Rockford)

- St. Croix River at Stillwater

Moderate FS 88.0 ft 57% vs Typically 17%

Major FS 89.0 ft 44% vs Typically 12%

- Mississippi River at St. Paul

Moderate FS 15.0 ft 85% vs Typically 19%

Major FS 17.0 ft 64% vs Typically 12%

Spring Flood Potential

Probability of Reaching Moderate/Major Flood Stage

Western Wisconsin (highlights)

- Chippewa River at Eau Claire

Moderate FS 776.0 ft 32% vs Typically 7%

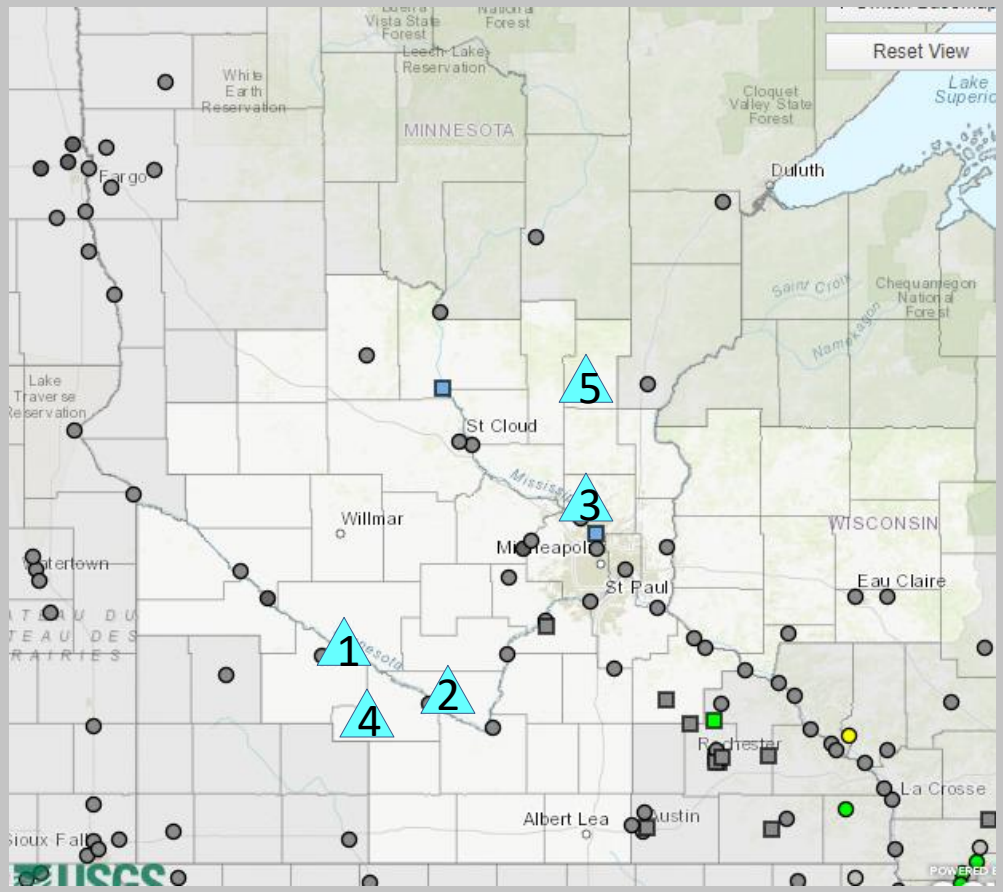
Major FS 778.0 ft 20% vs Typically 4%

- Chippewa River at Durand

Moderate FS 15.5.0 ft 51% vs Typically 13%

Major FS 17.0 ft 25% vs Typically 6%

New River Forecast and Warning Points



The NCRFC and NWS Twin Cities announced five new River Forecast Points in Minnesota for this season (beginning March 1st:

1. Minnesota River at Morton
2. Minnesota River at New Ulm
3. Mississippi River at Hwy 169 Bridge at Champlin
4. Cottonwood River near Springfield
5. Snake River at Mora

Upcoming Outlooks and Services

This outlook will be updated on March 7th, and then throughout the month as significant information becomes available.

We expect to hold a webinar with the early March update…stay tuned!

Call us anytime on the 24/7 Operations Line: 952-361-6671

During the week, call Service Hydrologist Craig Schmidt:

952-368-2542; craig.schmidt@noaa.gov